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CENTO CENTRAL TREATY ORGANIZATION

ANKARA



IRAN • PAKISTAN • TURKEY • UNITED KINGDOM • UNITED STATES ECONOMIC PROGRAMME

May 10, 1976

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EC/25/M/DZ

ADVISORY GROUP ON MINERALS DEVELOPMENT

REGIONAL INVESTIGATION OF TECTONIC AND IGNEOUS GEOLOGY IN CENTO REGION - SECOND QUARTERLY REPORT

RECEIVED
NASA STI FACILITY
ACQ. BR.

JUN 08 1976

DCAF# 629100

Reference EC/24/D10 dated January 29, 1976

2. CENTO is participating in the Earth Resources Technology Satellite Programme of the National Aeronautics and Space Administration (NASA) of the USA and has entered into an agreement to conduct investigations of tectonic and igneous geology in six test sites of the Region for which images and data acquired by remote sensors are to be supplied by NASA.

3. Under the terms of the agreement CENTO Secretariat is required to submit quarterly progress reports to NASA on the basis of investigations and results reported by the national geological organizations of the Region i.e. Geological Survey of Iran (GSIR), Geological Survey of Pakistan (GSP) and Mineral Research and Exploration Institute of Turkey (MTA). Submission of second quarterly report to NASA was due in March 1976. Till now only GSIR and MTA have furnished their reports on the basis of which Secretariat has compiled the Second Quarterly Report on the project which is attached as Annex "A" and is being transmitted to NASA.

ACTION REQUESTED

4. The Government of Pakistan is requested to advise the Geological Survey of Pakistan to expedite submission of their report on the project as early as possible.

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Turkey	12
U.K.	16
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(E76-10392) REGIONAL INVESTIGATION OF
TECTONIC AND IGNEOUS GEOLOGY IN IRAN,
PAKISTAN AND TURKEY Quarterly Report, 1
Dec. 1975 - 29 Feb. 1976 (Central Treaty
Organization, Ankara (Turkey).) 10 p

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ANNEXE "A" TO
EC/25/M/D2

INVESTIGATION NO. 28410

SECOND QUARTERLY REPORT
ON
REGIONAL INVESTIGATION
OF
TECTONIC AND IGNEOUS GEOLOGY
IN
IRAN, PAKISTAN AND TURKEY
BY

CENTRAL TREATY ORGANIZATION SECRETARIAT.

MAY 7, 1976

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SECOND QUARTERLY REPORT

28410 - REGIONAL INVESTIGATION OF TECTONIC AND
IGNEOUS GEOLOGY IN IRAN, PAKISTAN AND TURKEY

I. INTRODUCTION

Central Treaty Organization (CENTO) is participating in the ERTS Follow-On Programme and has entered into an agreement with National Aeronautics and Space Administration (NASA) to conduct analysis of ERTS data, through the National Geological Organizations of its Regional Member Governments for investigation of tectonic and igneous geology in six test sites in the Region 2 in Iran, 2 in Pakistan and 2 in Turkey. The First Quarterly Report covered the period September 1, 1975 to November 30, 1975 and was issued as CENTO Document No. EC/24/M/D10 dated January 29, 1976. This Second Quarterly Report covers the period December 1, 1975 to February 29, 1976 and has been compiled on the basis of the reports submitted by the Coinvestigators from the National Geological Organizations of Iran and Turkey. No report was received till yet from Pakistan. For the First Quarterly Report submitted by the CENTO Secretariat to NASA, the Geological Survey of Iran did not submit any contribution as no progress was reported to have been made during that period due to deficiencies in the required number of trained personnel and necessary equipment.

II. TECHNIQUES

Geological Survey of Iran (G.S.I.) reports that all imageries received from EROS Data Center for the project were indexed and archived. GSI has established a Remote Sensing Division and are in the process of setting up two viewer instruments. For the study of tectonic and igneous geology of the test site in Iran, paper prints on 1:1,000,000 (Product Code 23) were used. Facilities of colour composite printing are not yet available at GSI.

Mineral Exploration and Research Institute of Turkey reports that a photomosaic of Turkey on 1:1,000,000 from reproductions of Band 5 has been completed. Preparation of photomosaic on 1:500,000 for North Anatolia fault zone and South-Western Turkey is underway. For distinguishing volcanic and igneous rocks from the sedimentary, band 5 was found most suitable while for tectonic study all the four bands were used. It was noted that even a little cloud cover effected the identification of lineaments while on wet lands lineaments appeared more prominent.

././ III. Accomplishments

III. ACCOMPLISHMENTS

GSI reports that the studies on the Landsat data did not yield any additional information about igneous geology than that already available through aerial photos on 1:50,000 scale. However, because of smaller scale of Landsat photos, it was possible to take a comprehensive look on the relationship of structural trends and magnetism. Certain new lineaments were also found out in Baft and Tehran areas which would be checked in the field later.

MTA reports that contacts of volcanic rocks are well distinguished on the images and are reasonably in conformity with the existing maps which is more true in case of basaltic rocks which give dark tonal contrast. In the case of tectonic study MTA reports to have obtained valuable data from the Landsat imageries regarding North Anatolian fault between Erzincan plain and Karliova. Suitable places in this area have been selected for ground truth studies.

IV. SIGNIFICANT RESULTS

From this and the previous report on the project it appears that the information gained from the imageries would result in revision of the existing tectonic maps of the Region.

V. PUBLICATION

The following reports issued by the Regional Geological Organizations and the CENTO Secretariat are appended:

- i) First Progress Report on the project by the Geological Survey of Iran.
- ii) Second Progress Report on the project by the Mineral Exploration and Research Institute of Turkey.
- iii) CENTO Report No. EC/24/M/D11 dated February 25, 1976 on the Second meeting of the Coinvestigators held at Ankara on February 16 & 17, 1976.

VI. PROBLEMS

Geological Survey of Iran has indicated difficulties in achieving desired progress on the project due to deficiencies of trained personnel and necessary equipment. To rectify this situation GSI reports that necessary steps are in hand.

./. VII Data, Quality

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ANNEXE "A" TO
EC/25/M/D2

VII. DATA, QUALITY AND DELIVERY

No dissatisfaction of any nature over the data quality or delivery was expressed by any national geological organization.

VIII. RECOMMENDATIONS:

None.

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REGIONAL INVESTIGATION OF TECTONIC AND IGNEOUS
GEOLOGY IN IRAN, PAKISTAN AND TURKEY

SECOND PROGRESS REPORT

Date of Coverage: December 1, 1975-February 29, 1976

15 March 1976

ANKARA

During the period of the Second Progress Report investigations were consantrated on the image interpretation by using magnifying glass, color additive viewer and available color composites from ERTS-A Having Solved reproduction and archieving problems during this period, the working groups could carry out better work. Within this period, a very detailed ground truth program has been arranged for checking new findings on the ground in the field in the comming summer season. Several groups and may geologists, image interpreters and photo technicians are working on the project. Following are the names and titles of some of the individuals. An organizational chart for the project is also enclosed.

-Mr. Morris Crawford

Principle Investigator

CENTO Deputy Secretary of General (Economics)

-Dr. Fethullah Özelçi

Co-Investigator

Deputy Director, Dept. of Geophysics

MTA Enstitüsü

-Dr. Tandoğan Engin

Co-Investigator for Intrusive and Volcanic Rocks Work

Chief, Chromite Section, Dept of Mineral

Exploration, MTA Enstitüsü

-Esen Arpat

Co-Investigator for Recent Tectonic Work Chief, Scientific Research Section, MTA Enstitüsü

REMOTE SENSING LABARATORY SECTION

(Photo reproduction, Archiving, distribution and coordination)

Chief= Ratıp Özakçay

Deputy Chief= Uarl Tümer

Photo Expert= Ersin Altan

Photo Interpreter (Mosaic Expert): Büke Tansel

Photo Interpreter: Gülten Mumcucğlu

Photo Interpreter: M. Ali Danışman

INVESTIGATION AND STUDY GROUPS

Igneous and Volcanic Rock Studies

Dr. Evren Yazgan

İsmail Henden

Mehmet Balcı

A doğan Boray

Narhan Tezel

Ahmet Ya. İnkılıç

Recent Tectonic Studies
Sahayla Çoşkun

Firat Karoğlu

Ground Fallow-

Igneous and Volcanic Rock Studies 6 field parties (each 1 geologist and 1 driver)

Recent Tectonic Studies

10 field parties (each 1 geologist and 1 driver)

During this period 33 new black and white images were received so that total amount of images have reached 123. unfortunately up to now no color images has been received

Except for few small areas all the test sites have been covered according to the frequency and date limits envisaged in the contract. These areas which are not covered have been given to the U.S. Coordinator during his visit to Turkey.

The preparation of a photomosaic of Turkey in 1/1.000.000 scale and with better quality reproductions in band 5 has been completed. Attempt is also made to prepare a relief effect image mosaic which appears to enhance coast lines and topographic drainage features. Work is underway to prepare a new photomosaic in 1/500.000 scale separately for North Anatolian Fault zone and South west part of Turkey.

Please find below a summary of reports of working groups for the period of this report.

The works Related to the Intrusive and Volcanic Rock Studies

To identify the volcanic and igneous rocks, the photographs taken on band 5, have been found most suitable as usual. Distinguishing volcanic and igneous rocks from sedimentary rocks is achieved easily by tonal difference. However this is not possible for volcanic rocks of acidic composition which appear in grey tones while basaltic lava flows have distinctively very dark tones. When compared with the existing geological maps, it is seen that the contacts drawn from the imageries are reasonably accurate especially for the basaltic rocks which have much tonal contrast. Drainage patterns of rocks considered with the tonal appearance of the rocks help for better identification.

Significant results:

Volcanic Rocks are well distinguished rocks on the images. Their contacts can be clearly and definitely separated with the other formations.

The contact of the volcanic rocks namely andesite, spilit, and porphyrite situated at the north of Sugla Lake can be followed on the image

for, 60 km in NS trend between Çavuş and Hatunsarag Villages.

The aluvium cones and probable alteration effects caused by the streams cutting through these volcanic rocks can also be clearly seen.

The Works Related to The Recent Tectonic Studies.

Four bands of black and white positive prints were used for all the studies. The cloud coverage on some of the images caused some difficulties to distinguish the lineaments and sometimes made it impossible to follow them depending on the percentage of cloud coverage.

Landsat images were interpreted together with the 1/35.000 scale aerial photography of the same area. Regular procedure was to check suspected lineaments on the images with aerial photography. In some cases in order to gain experience, lineaments that are visual on photography were searched on the images.

Results were compared by the results of the field work that has been done previously and for the coming summer season a plan is made for extensive collection of field data from the area.

North Anatolian Fault zone is not well known from Erzincan to the east except for Varto region. Valuable data were obtained about the fault zone between Erzincan Plain and Karlıova from the LANDSAT images. One of the two fault zones that lie on the north of the region seems to be more active. Suitable places on the area has been selected for ground truth studies.

Data Quality Recommendations

On a critical area even a little cloud coverage effects the properties of lineaments. For that reason it is suggested that images having less cloud coverage and covering more wet lands will be more suitable for interpretation for lineament studies. Water appears to enhance lineaments. Images taken in dry season appears to lose details on lineaments.

ORGANIZATIONAL CHART FOR THE PROJECT

